CLAIMS

1. A power amplifier arrangement comprising:

a power amplifier for receiving an input signal and amplifying said input signal to form an output signal, the power amplifier having an output capacitance which varies;

a power supply for supplying a power supply voltage to the power amplifier which is modulated proportionally with respect to changes in the input signal;

a variable capacitor having a variable capacitance which in combination with the output capacitance results in an adjusted output capacitance, wherein the variable capacitor is controlled so that the adjusted output capacitance is substantially constant.

2. A power amplifier arrangement according to claim 1, further comprising a signal processing unit for receiving said input signal and for providing a first control signal to the power supply, said signal processing unit forming said first control signal responsive to said input signal;

wherein the power supply modulates the power supply voltage in response to the first control signal so as to vary said power supply voltage proportionally with respect to changes in the input signal.

3. A power amplifier arrangement according to claim 2, wherein the signal processing unit is adapted to

generate a second control signal to the variable capacitor which controls the variable capacitance of the variable capacitor for the purpose of maintaining the adjusted output capacitance to be substantially constant.

4. A power amplifier arrangement according to claim 3, wherein the input signal to the power amplifier is time delayed to allow the power supply voltage to be modulated in time with amplification of the input signal by the power amplifier; and

wherein the second control signal is time delayed, synchronous with the input signal to the power amplifier, to allow the substantially constant adjusted output capacitance to be provided even while the output capacitance of the power amplifier is changing due to a change in operating power supplied to the power amplifier caused by modulation of the power amplifier power supply by the input signal.

5. A power amplifier arrangement according to claim 1, wherein the variable capacitor is located at an output stage of the power amplifier.

6. A power amplifier arrangement according to claim 1, further comprising an impedance matching network connected at the output of the power amplifier to provide impedance matching to an output impedance of the power amplifier.

7. A power amplifier arrangement according to claim 1, wherein the adjusted output capacitance is a function of the output capacitance, as well as a function of a capacitance of the variable capacitor, such that the

adjusted output capacitance = f(output capacitance, capacitance of the variable capacitor), and wherein the capacitance of the variable capacitor is controlled such that the adjusted output capacitance is substantially constant.

8. A power amplifier arrangement according to claim 2, further comprising a predistortion module for providing a predistorted version of the input signal to the power amplifier, said predistortion module receiving from the signal processing unit predistortion coefficients for distorting said input signal, said predistortion coefficients being formed by said signal processing unit responsive to said input signal.

9. A power amplifier arrangement according to claim 2, wherein the signal processing unit receives a feedback signal from at least one of the power amplifier and the power supply and wherein said first control signal formed by the signal processing unit is formed using at least one of the input signal, a power supply feedback signal and a power amplifier feedback signal.

10. A power amplifier arrangement according to claim 1, wherein the variable capacitor is a high power, high Q-factor device.

11. A power amplifier arrangement according to claim 1, wherein the variable capacitor is a voltage controlled device.

12. A power amplifier arrangement according to claim 11, wherein the voltage controlled device is a micro-electromechanical system (MEMS) device.

13 A power amplifier arrangement according to claim 1, wherein the variable capacitor is a current controlled device.

14. A power amplifier arrangement according to claim 13, wherein the current controlled device is a micro-electromechanical system (MEMS) device.

15. A power amplifier arrangement according to claim 3, further comprising a digital-to-analog converter, a low pass filter and an operational amplifier, wherein the signal processing unit is adapted to generate the second control signal based on a lookup table means and supply the second control signal to the variable capacitor, via serial succession of the digital-to-analog converter, the low pass filter and the operational amplifier placed between the signal processing unit and the variable capacitor, which controls the variable capacitance of the variable capacitor so that the adjusted output capacitance is substantially constant.

16. A power amplifier arrangement according to claim 1, wherein the variable capacitor is a micro-electromechanical system (MEMS) device comprised of a flexible top plate, a fixed bottom plate, and at least one support post to support the flexible top plate.

17. A power amplifier arrangement according to claim 16, wherein the at least one support post consists of a single support post to support the flexible top plate, wherein the flexible top plate is attached to the single support post and the flexible top plate acts is a cantilever structure.

18. A power amplifier arrangement according to claim 16, comprising multiple support posts to support the flexible top plate wherein the flexible top plate is attached to the multiple support posts.

19. A power amplifier arrangement according to claim 16, formed from materials selected from a group consisting of silicon, polysilicon, and aluminium

20. A method of operating a power amplifier arrangement, comprising the steps of:

providing an input signal to a power amplifier, the power amplifier amplifying the input signal to form an output signal, the power amplifier having an output capacitance which varies;

providing a power supply voltage to the amplifier to enable the power amplifier to amplify the input signal;

modulating the power supply voltage to the power amplifier in response to a first control signal received by the power supply from a signal processing unit, said signal processing unit forming said first control signal responsive to the input signal, wherein the power supply modulates the power supply voltage so as to vary said power supply voltage proportionally with respect to changes in the input signal;

providing a second control signal from the signal processing unit to a variable capacitor having a variable capacitance which in combination with the output capacitance results in an adjusted output capacitance, said signal processing unit adapted to generate the second

control signal which controls the variable capacitance of the variable capacitor so that the adjusted output capacitance is substantially constant; and

time delaying inputting of the input signal to the power amplifier in order to allow the power supply voltage to be modulated in time with amplification of the input signal by the power amplifier.

21. A method according to claim 20, further comprising the step of time delaying inputting the second control signal, synchronous with the input signal to the power amplifier, to the variable capacitor so that the variable capacitance of the variable capacitor is controlled for the purpose of maintaining the adjusted output capacitance to be substantially constant.

22. A method according to claim 20, further comprising the step of predistorting the input signal so as to provide the power amplifier with a predistorted version of the input signal for amplification.

23. A method according to claim 22, wherein the input signal is predistorted by a predistortion module which receives predistortion coefficients generated by the signal processing unit, said predistortion coefficients being generated by the signal processing unit responsive to the input signal.

24. A method according to claim 20, wherein the method further comprises providing to the signal processing unit a feedback signal from at least one of the power amplifier and the power supply and wherein the first control signal is formed by the signal processing unit

utilizing at least one of the input signal, a power supply feedback signal and a power amplifier feedback signal.

25. A method of operating a power amplifier according to claim 20, wherein the variable capacitor is a voltage controlled device.

26. A method of operating a power amplifier according to claim 20, wherein the variable capacitor is a current controlled device.

27. A method of operating a power amplifier according to claim 20, wherein the variable capacitor is a micro-electromechanical system (MEMS) device.

28. A wireless communications base station transmitter including a power amplifier arrangement according to claim 1.

29. A communications network including a power amplifier arrangement according to claim 1.

30. A method of amplifying an input signal using a power amplifier having a power supply input, the method comprising the steps of:

receiving the input signal;

amplifying the input signal using the power amplifier to provide an output signal, the power amplifier having an output capacitance which varies;

modulating the power supply input to the power amplifier in accordance with a first control signal responsive to said input signal, wherein the method

includes the step of time delaying inputting of the input signal to the power amplifier to allow the power supply input to be modulated in time with amplification of the input signal by the power amplifier; and

providing a second control signal to a variable capacitor having a variable capacitance which in combination with the output capacitance results in an adjusted output capacitance, wherein the second control signal controls the variable capacitance of the variable capacitor so that the adjusted output capacitance is substantially constant.

31. A method of amplifying a signal using a power amplifier having a power supply input according to claim 30, the method further comprising the step of time delaying inputting the second control signal, synchronous with the input signal to the power amplifier, to the variable capacitor so that the variable capacitance of the variable capacitor is controlled for the purpose of maintaining the adjusted output capacitance to be substantially constant.

32. A method of amplifying a signal using a power amplifier having a power supply input according to claim 30, wherein the variable capacitor is a voltage controlled device.

33. A method of amplifying a signal using a power amplifier having a power supply input according to claim 30, wherein the variable capacitor is a current controlled device.

34. A method of amplifying a signal using a power amplifier having a power supply input according to claim

30, wherein the variable capacitor is a micro-electromechanical system (MEMS) device.

35. A program for a computer for controlling a power amplifier arrangement comprising a power amplifier, a power supply, and a signal processing unit, the program comprising code to carry out the steps of:

providing an input signal to the power amplifier, the power amplifier amplifying the input signal to form an output signal, the power amplifier having an output capacitance which varies;

providing a power supply voltage to the power amplifier to enable the power amplifier to amplify the input signal;

modulating the power supply voltage to the power amplifier in response to a first control signal received by the power supply from a signal processing unit, said signal processing unit forming said control signal responsive to the input signal, wherein the power supply modulates the power supply voltage so as to vary said power supply voltage proportionally with respect to changes in the input signal;

providing a second control signal from the signal processing unit to a variable capacitor having a variable capacitance which in combination with the output capacitance results in an adjusted output capacitance, said signal processing unit adapted to generate the second control signal which controls the variable capacitance of the variable capacitor so that the adjusted output capacitance is substantially constant; and

time delaying inputting of the input signal to the power amplifier in order to allow the power supply voltage to be modulated in time with amplification of the input signal by the power amplifier.

36. A program for a computer for controlling a power amplifier arrangement according to claim 35, the program further comprising code to carry out the step of time delaying inputting the second control signal, synchronous with the input signal to the power amplifier, to the variable capacitor so that the variable capacitance of the variable capacitor is controlled for the purpose of maintaining the adjusted output capacitance to be substantially constant.

37. A method of providing a signal transmission service over a communications network including a power amplifier arrangement according to claim 1.